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OBJECTIVE STUDIES OF THE ACHIEVEMENTS OF TRAINING-SCHOOL AND PUBLIC-SCHOOL PUPILS IN THE FRESHMAN YEAR OF THE HIGH SCHOOL¹

GEORGE N. CADE AND WILLIAM S. GRAY
School of Education, University of Chicago

The investigation which is reported in this article was undertaken to determine the relative efficiency of teaching in elementary training schools which are connected with normal schools and in elementary public schools. The investigation was prompted primarily by the fact that in some communities in which training schools are located patrons object to sending their children to the training school on the assumption that student teaching is inferior. Universities in many sections meet the same objection when they attempt to secure the co-operation of public high schools in the training of teachers.

A study² of this problem was presented in a report in 1917, in which the standing of elementary training-school pupils was compared with the standing of public-school pupils in subjects taken during the first years of the high school. This report included data from the records of 1,500 pupils of five high schools which were connected with four normal schools of Illinois and with the University of Chicago. These high schools were selected because pupils from both types of elementary schools were found in the Freshman classes, and they offered therefore an opportunity for making a compara-

¹GEORGE N. CADE, *Objective Studies of the Achievements of Training-School and Public-School Pupils in the Freshman Year of the High-School* Master's Thesis. University of Chicago, March, 1918.

²*Practice Teaching for Teachers of Secondary Schools*, Department of the Interior, Bureau of Education, Bulletin No. 29, 1917.

tive study of the standing of training-school and public-school pupils. The investigation revealed the fact that the average standing of the training-school pupils was approximately the same as the standing of the public-school pupils. The tentative conclusion was therefore drawn that no marked advantage could be attributed to training-school instruction or to public-school instruction.

The investigation which is reported in this article differs from the investigation of a year ago in that the achievement of the pupils was determined by means of standard tests based on elementary-school subjects. Tests in reading, writing, arithmetic, spelling, and language were selected, because these subjects include the basic lines of training given in elementary schools. The following standard tests were used: the Spiral Arithmetic Test, to measure mastery of the fundamentals in arithmetic; Stone's Reasoning Test, to measure ability to solve arithmetical problems involving more or less reasoning; Starch's Silent-Reading Test No. 8, to measure rate of reading; the Kansas Silent-Reading Test, to measure ability to interpret directions or questions read; the Gettysburg edition of the Ayres Handwriting Scale, to determine the quality of handwriting; words from the Ayres Spelling Scale, to measure ability to spell words in lists and words in sentences; and Starch's Language Test, known as Grammatical Scale A, to determine the pupil's control of language forms. Tests of a much wider variety should have been included in order to measure the results of instruction in all phases of elementary-school work. The conclusions to which this investigation points relate, therefore, only to the relative standing of training-school and public-school pupils during the first year of the high school in the fundamentals of elementary-school work as outlined above.

The following schools co-operated in the investigation: the public high schools of Goshen, Indiana, Ypsilanti, Michigan,

and DeKalb, Illinois; the high schools of the University of Chicago and of Brigham Young University at Provo, Utah; and the high schools which are connected with the state normal schools at Normal, Illinois, Macomb, Illinois, Carbon-dale, Illinois, and Warrensburg and Springfield, Missouri. Each of these high schools, with the exception of the high school at Goshen, Indiana, is made up in part of pupils who have attended elementary training schools. This high school was selected as one of the ten because it included a representative group of pupils who have passed through public elementary schools and therefore could be used to advantage to check the results from the somewhat selected groups of public-school pupils who secure admission to high schools which are connected with normal schools.

The tests were given during November, 1917, to 572 pupils. Of this number, 185 entered high schools from training schools and 387 from public schools. The training-school pupils were classified on the basis of the number of years during which they had attended training schools. The validity of classifying pupils who have attended a training school for less than

TABLE I
EFFECT OF LENGTH OF ATTENDANCE IN THE TRAIN-
ING SCHOOL ON STANDING IN SCHOOL SUBJECTS

NO. OF YEARS IN TRAINING SCHOOL	No. of PUPILS	MEDIAN SCORE	
		Stone's Reasoning Test	Kansas Silent- Reading Test
Entire course.	45	9.60	23.33
7.....	15	8.80	22.50
6.....	25	10.50	25.00
5.....	24	8.15	25.83
4.....	17	11.14	21.25
3.....	21	12.00	21.25
2.....	18	10.43	23.33
1.....	20	7.50	20.00

one-half of the elementary-school period as training-school pupils might be challenged. In order to determine the effect of length of attendance in the training school on standing in elementary-school subjects the median scores of each group of pupils was determined for Stone's Reasoning Test and for the Kansas Silent-Reading Test.

The entries in Table I indicate that length of attendance in the training school is not a large factor in determining standing in school subjects. The validity of including with the training-school pupils the group which had been in the training school only one year is open to question. Inasmuch, however, as this group represents such a small percentage of the total number of pupils, the final results of this investigation have not been modified to any great extent by classifying this group as training-school pupils.

The tests were given by the teachers of the high schools which co-operated in the investigation. Mimeographed sets of directions were prepared in order to insure a high degree of uniformity in the conditions and procedure of giving the tests. The tests were scored and tabulated by Mr. George N. Cade, a graduate student in the University of Chicago, to whom full credit should be given for whatever contribution this study makes. The results of the various tests will now be discussed separately.

The rate of reading was determined through the use of Starch's Silent-Reading Test No. 8. The median rates for each group are represented in Diagram 1. The numbers in the vertical column to the left of the diagram refer to the number of words read per second. The Roman numerals in the horizontal row at the bottom of the table refer to nine of the high schools which co-operated. The high schools were numbered in order on the basis of the median rates of the training-school pupils in each high school. The various high schools are represented in the same order in all the

diagrams of this report. The solid oblique line represents the median rates of the various groups of training-school pupils included in this investigation, and the solid horizontal line represents the median rate of all training-school pupils tested. The dotted oblique line and the dotted horizontal line represent corresponding facts with regard to public-school pupils. The broken horizontal line represents the median rate of the pupils of Goshen.

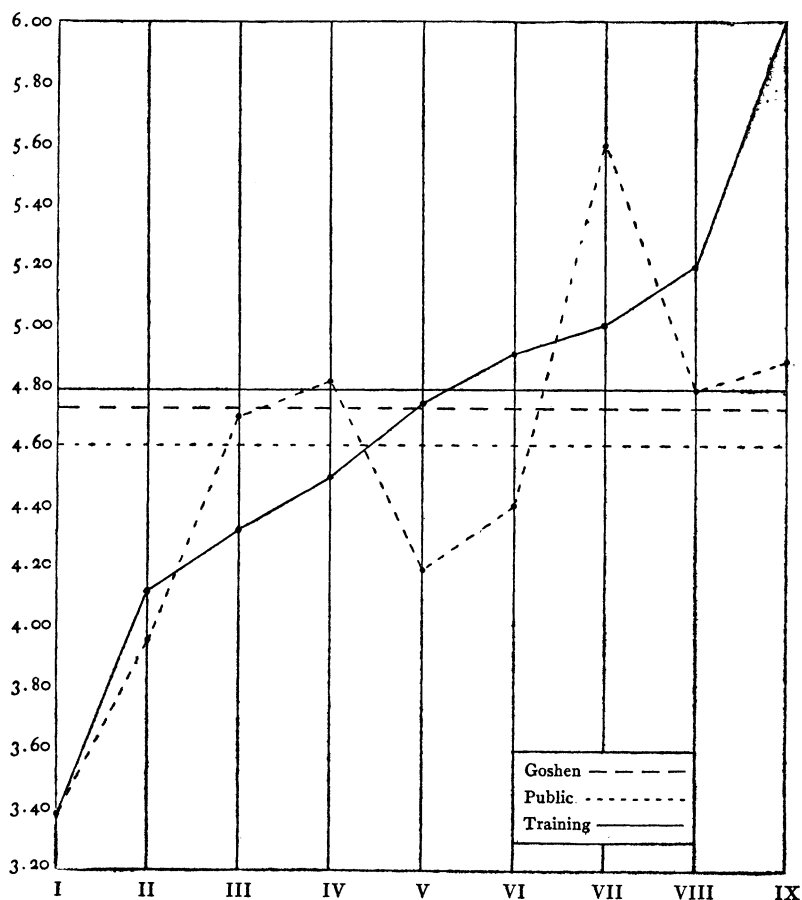


DIAGRAM I.—Median rates of silent reading in words per second

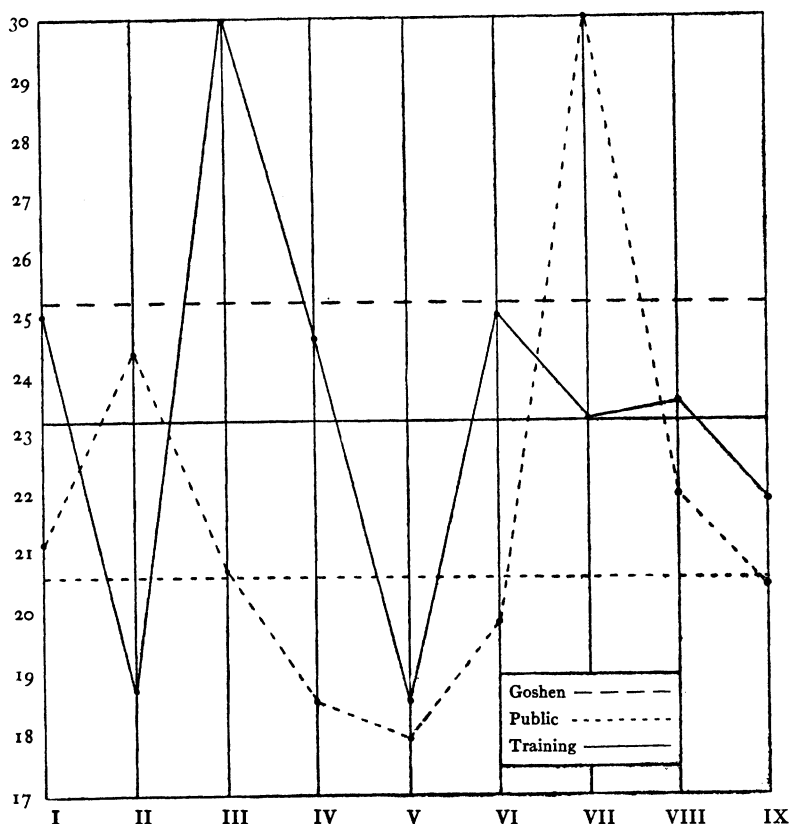


DIAGRAM 2.—Median scores in the Kansas Silent-Reading Test

The diagram reveals the following facts with regard to the pupils tested: (1) The training-school pupils read at a median rate of 4.79 words per second and the public-school pupils at a rate of 4.61 words per second. This represents a superiority of 0.18 word per second in favor of the training-school pupils. (2) The pupils of Goshen read on the average more rapidly than do the public-school pupils of nine high schools, but not so rapidly as the training-school pupils. (3) The median rates of various training-school groups vary widely. The highest median rate is 6 words per second and

the lowest median rate is 3.40 words per second. The variation in the median rates of the public-school groups is almost as wide. (4) The training-school pupils and the public-school pupils attending a given high school follow somewhat closely the same level of achievement. This fact is particularly noticeable in the cases of Schools I, II, III, IV, and less noticeably true in the cases of several other schools. This general correspondence in rates indicates that there are community factors, such as similarity in economic status of pupils, and common ideals and standards among all teachers of a community, which are more significant in determining the outcome of instruction than is either training-school instruction or public-school instruction alone.

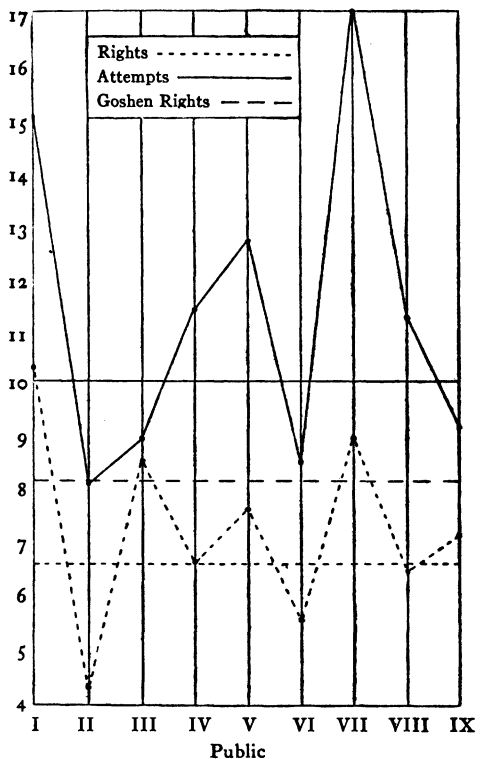
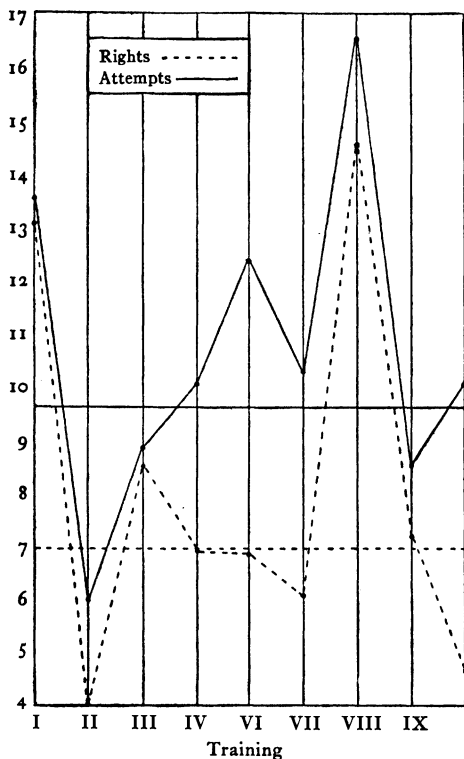


DIAGRAM 3.—Median scores in Set H of the Spiral Arithmetic Tests

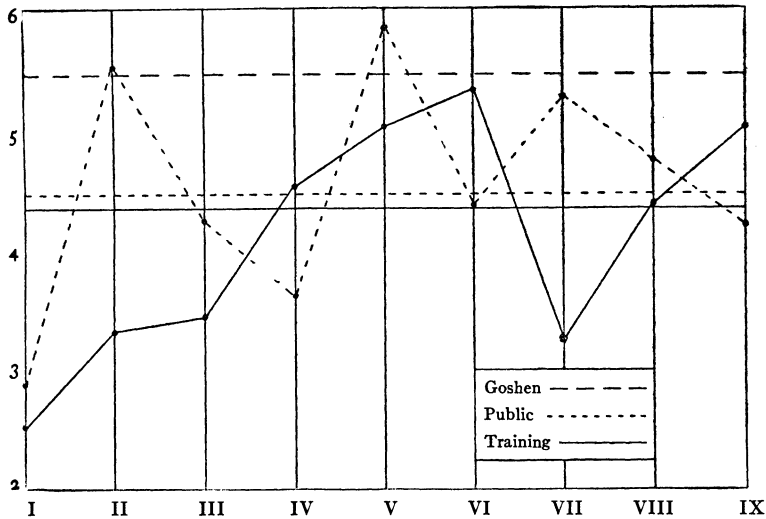


DIAGRAM 4.—Median number of rights in Set J of the Cleveland Spiral Tests

The Kansas Silent-Reading Test was used to determine how well pupils understand what they read. The median scores are represented in Diagram 2. The median score of the training-school pupils is 23.33, of the public-school pupils 20.69, and of Goshen, 25.31. The median score of the training-school pupils is distinctly superior to that of the public-school pupils. The difference is equal to 7.8 per cent of the score of the public-school pupils. In both rate of reading and comprehension the training-school pupils are superior to the public-school pupils. It should be noted that the median score of Goshen is superior to both of the median scores just considered. The diagram shows that there is wide variation in the scores of the public-school pupils in the various high schools. The variation in the scores of the training-school groups is approximately as wide. The close correspondence in the scores of the two groups of pupils attending a given high school which was noted in the results for rate of reading is not apparent in this diagram. In fact, there is wide varia-

tion in the scores of the two groups of pupils in a number of schools. Schools II, III, IV, VI, and VII are illustrations. In some cases the public-school group secures the higher score; and in other cases the training-school group secures it. These facts indicate that the schools which send pupils to a given high school obtain more uniform results in rate of reading, as measured by the Starch Reading Test, than in comprehension of what is read, as measured by the Kansas Silent-Reading Test.

The Spiral Arithmetic Tests used in the Grand Rapids and in the St. Louis surveys were used in this investigation to measure achievement in the fundamentals of arithmetic. Diagram 3 represents the median scores for Set H, which includes the addition and subtraction of fractions of like denominators. The left half of the diagram compares the

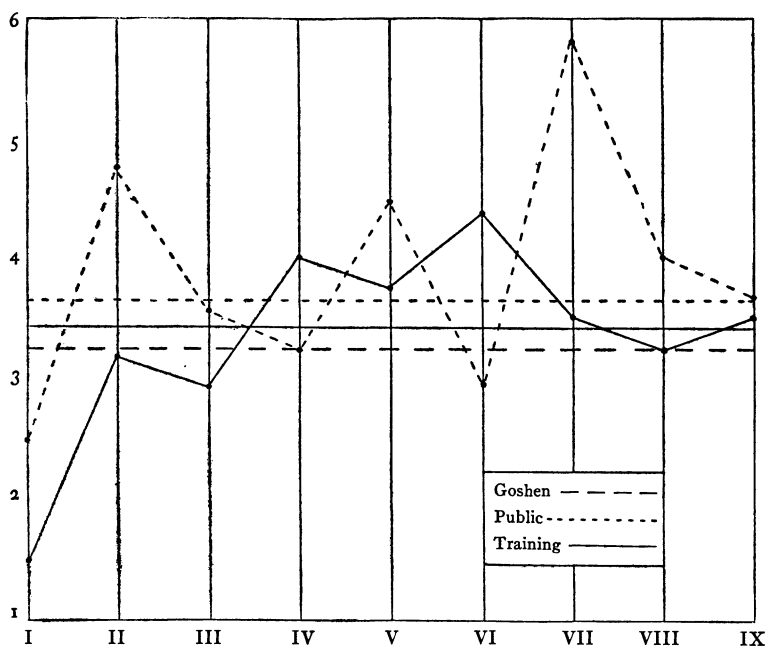


DIAGRAM 5.—Median number of rights in Set L of the Spiral Arithmetic Tests

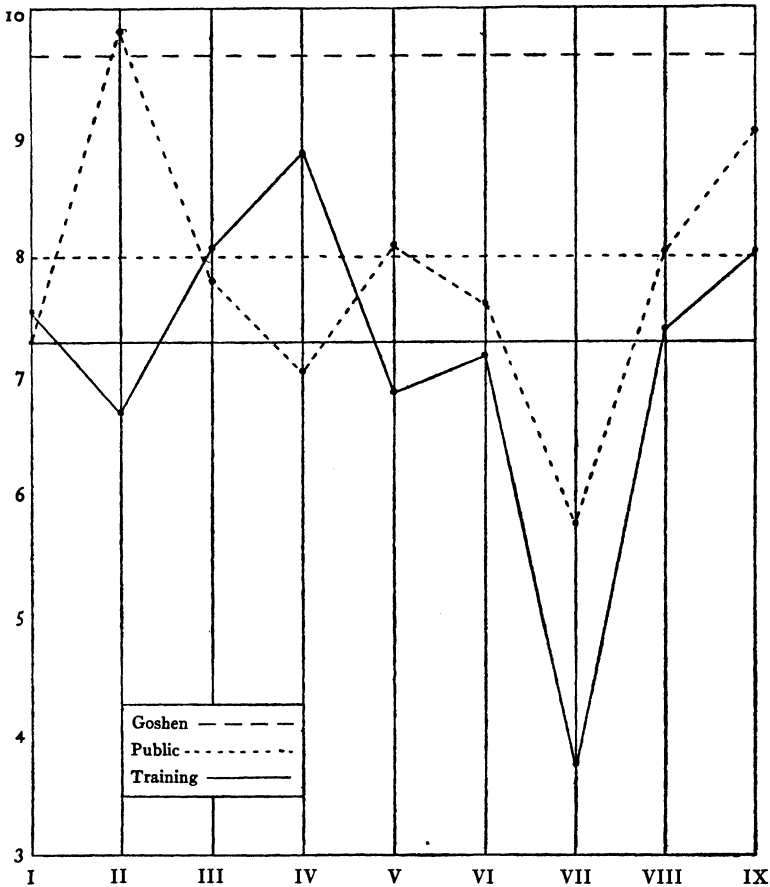


DIAGRAM 6.—Median number of rights in Set K of the Spiral Arithmetic Tests

number of problems attempted and the number of problems solved correctly by the training-school pupils. The right half represents the corresponding facts for the public-school pupils. The diagram shows that the public-school pupils attempted more problems on the average than did the training-school pupils, but that they solved fewer problems correctly during the assigned period.

Diagram 4 represents the median number of rights for Set J, which includes the addition of one-place numbers in columns containing thirteen numbers. The diagram shows that the public-school pupils solved correctly more problems of this type in a given period than did the training-school pupils. The distinctly superior record of Goshen merits commendation.

Diagram 5 represents the median number of rights for Set L, which includes the multiplication of four-place numbers by two-place numbers. The diagram shows that the public-

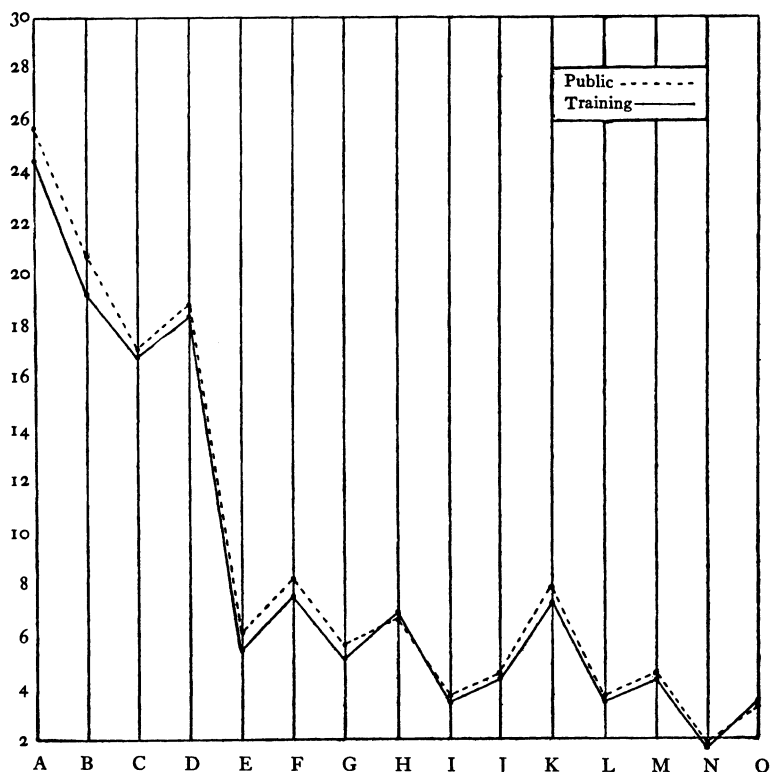


DIAGRAM 7.—Median number of rights in the fifteen sets of the Spiral Arithmetic Tests.

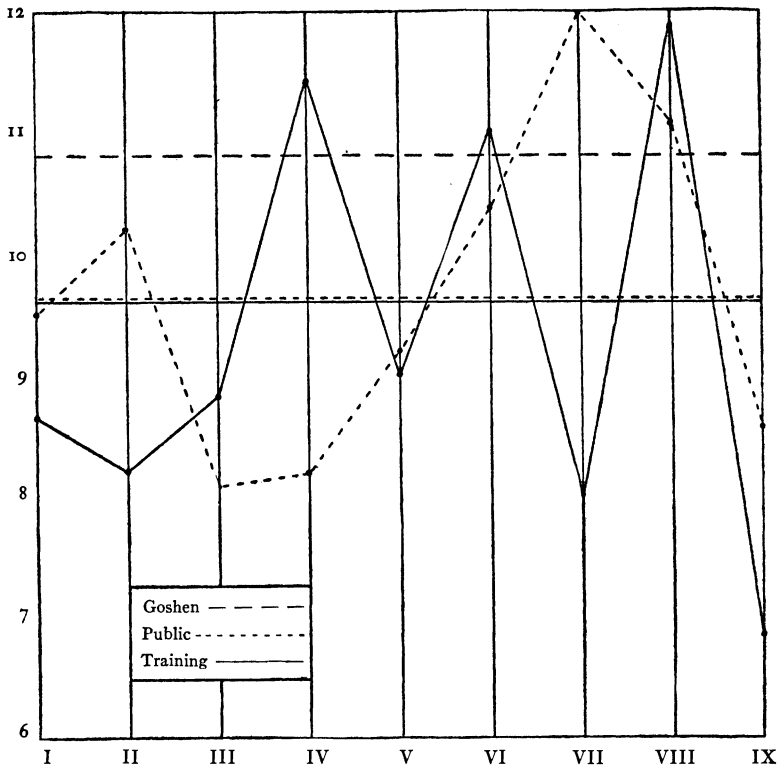


DIAGRAM 8.—Median scores in Stone's Reasoning Test

school pupils are only slightly superior to training-school pupils in this type of problem.

Diagram 6 represents the median number of rights for Set K, which includes the division of three- and four-place numbers by two-place numbers. As in the case of Set J, the public-school pupils rank distinctly higher than the training-school pupils. The median score of Goshen is excelled only by the median score of the public-school group of School II.

The median number of rights for each of the fifteen sets of the Spiral Arithmetic Tests is represented in Diagram 7. The diagram shows that the public-school pupils rank higher

than the training-school pupils in all sets excepting H and O. It is interesting to note that these two sets are the only sets in the entire test involving fractions.

Stone's Reasoning Test was used to measure ability to solve arithmetical problems involving reasoning. The median scores are represented in Diagram 8. The median score of the public-school pupils is 9.62, and the median score of the training-school pupils is 9.61. The difference is too small to justify us in attributing superiority to either group. Goshen, on the other hand, makes an usually high score.

The median scores for Starch's Language Test are represented in Diagram 9. They are shown in the diagram to be approximately the same for training-school pupils and for

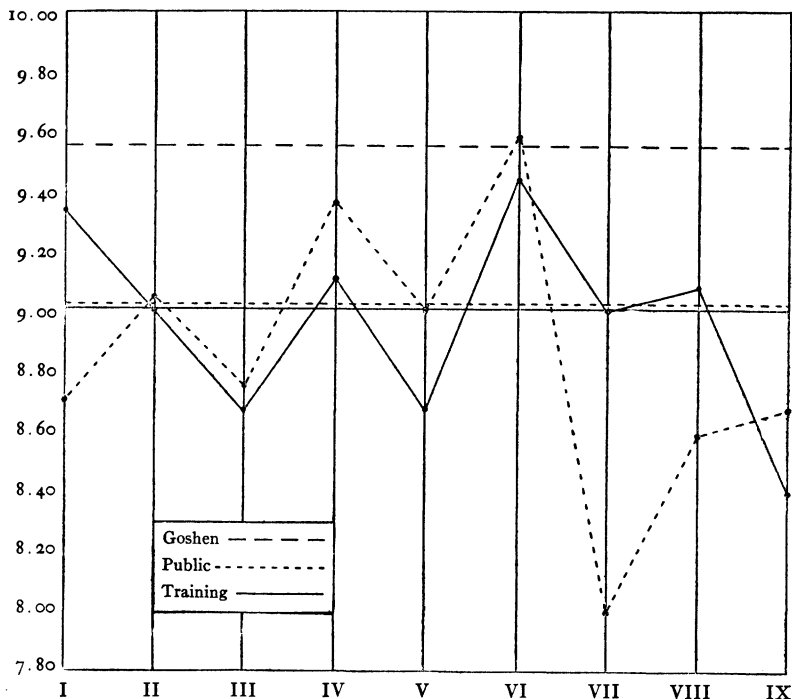


DIAGRAM 9.—Median scores in Starch's Grammatical Scale A

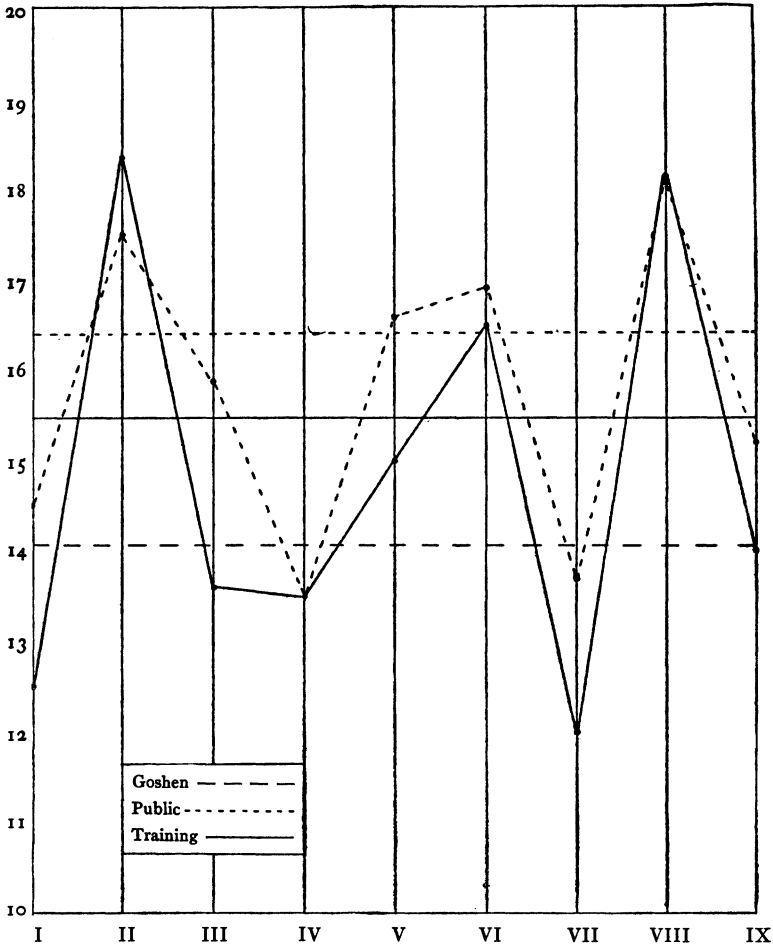


DIAGRAM 10.—Median scores in the spelling of words in lists

public-school pupils. The superior record of Goshen is again noteworthy. Attention is called to the close correspondence in the scores of the two groups of pupils in the respective high schools.

Diagram 10 represents the median score of the training-school pupils and the public-school pupils in the spelling of words in lists. The scores represent the number of words

spelled correctly in a list of twenty. The diagram reveals the fact that the public-school pupils made a higher score than the training-school pupils. The unusually low score of Goshen indicates that this phase of the work in the elementary school of that city requires additional attention.

Diagram II represents the median scores of the training-school pupils and of the public-school pupils in the spelling of

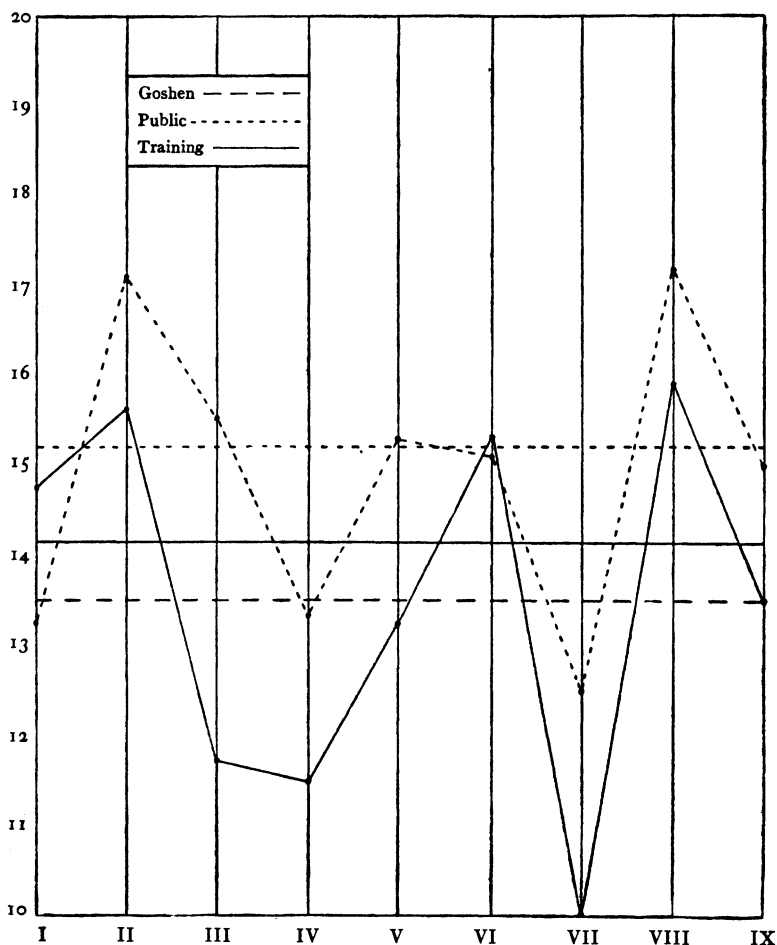


DIAGRAM II.—Median scores in the spelling of words in sentences.

words in sentences. The relative standing of the three groups of pupils is the same in this case as was revealed in the spelling of words in lists. The public-school pupils rank first, the training-school pupils second, and the pupils of Goshen third.

Diagram 12 compares the accuracy of spelling words in lists with the accuracy of spelling words in sentences. The left half of the diagram presents the facts for the public-school pupils and the right half the facts for the training-school pupils. The diagram shows that practically all the groups tested spell words in lists more accurately than words in sentences. The training-school group attending School I forms the only exception to the general statement just made. It would be very interesting to determine whether or not spelling is taught differently in this particular training school or whether the result is due to some chance factor. The diagram shows in addition that the difference between the results in the two types of spelling is greater in the case of the training-school pupils than in the case of the public-school pupils. Expressed in terms of number of words spelled correctly, the difference in the scores of the training-school pupils is 1.33 words, and of the public-school pupils 1.21 words. These facts indicate that training schools should give relatively more attention to accuracy in spelling, particularly when the words are used in context.

Diagram 13 represents the Quality Scores in Handwriting as determined through the use of the Gettysburg edition of the Ayres Handwriting Scale. The fact is revealed that the training-school pupils scored higher than the public-school pupils. Quality of handwriting is a second phase of school work to which added attention should be given in Goshen, as is revealed by the results of this study.

Diagram 14 presents in graphic form the median scores of six of the tests. The results of the Cleveland Arithmetic Test are not included because of the limitation of space. The facts

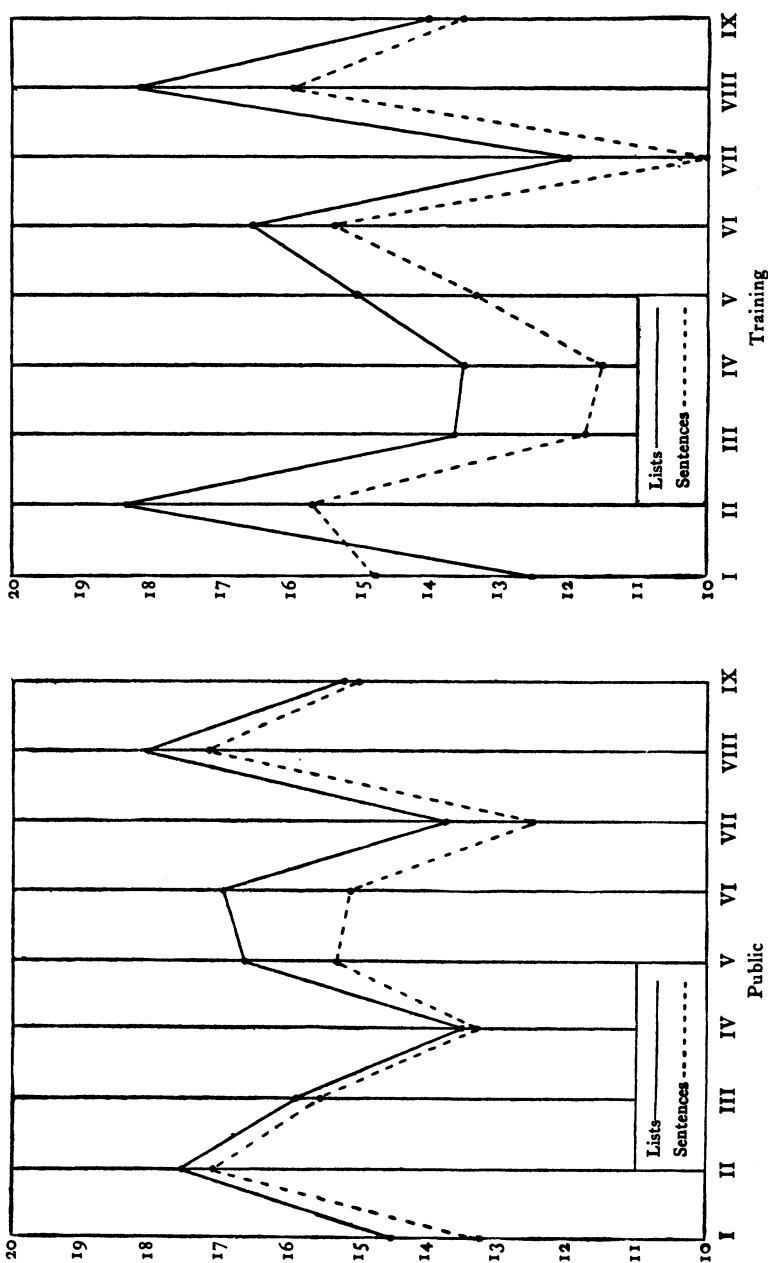
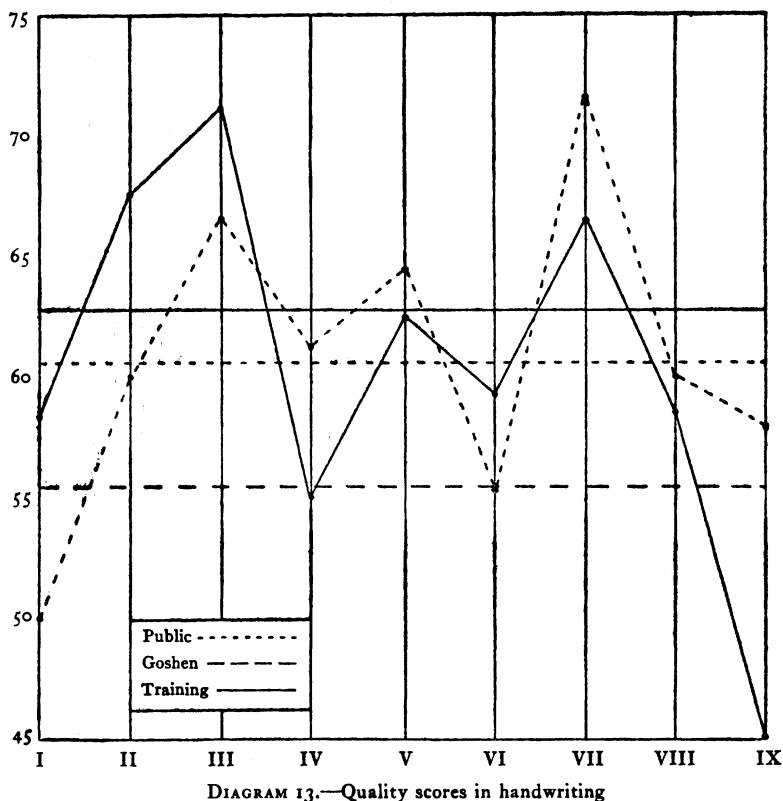


DIAGRAM 12.—Comparison of the accuracy of spelling words in lists and words in sentences



of this diagram, together with the discussions which have preceded, justify the following conclusions concerning the relative efficiency of training-school and public-school pupils in the fundamental subjects of the elementary-school curriculum:

1. The median scores for the various subjects reveal the fact that training schools and public schools alike do superior and inferior work. In Stone's Reasoning Tests and in Starch's Language Tests the median scores of the two groups of pupils were approximately the same. In rate of reading, in interpretation of what is read, in quality of handwriting, and in the solution of two of the fifteen sets of arithmetic exercises the training-school pupils received the higher scores. In spelling

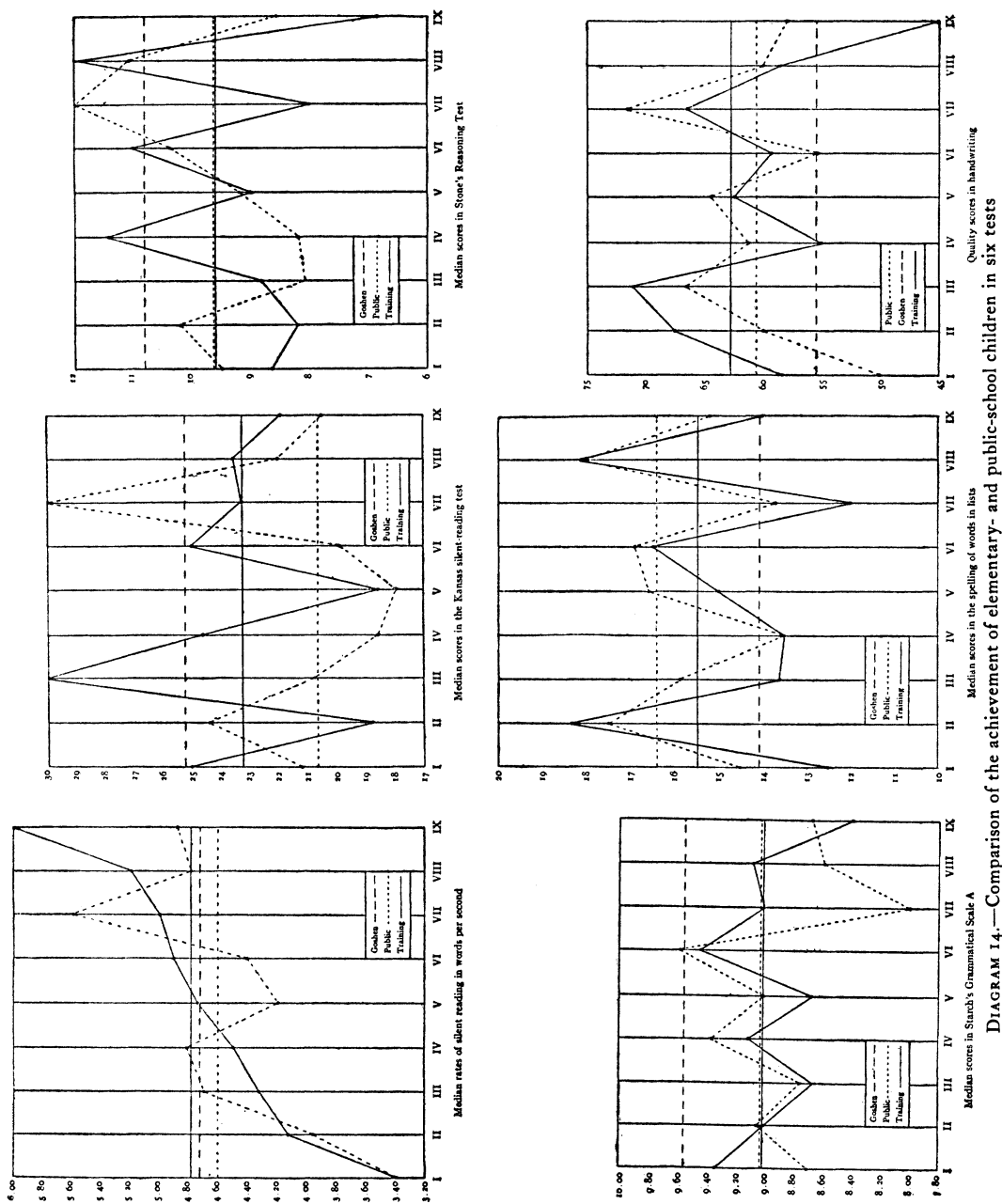


DIAGRAM 14.—Comparison of the achievement of elementary- and public-school children in six tests

words in lists and in sentences and in thirteen of the fifteen sets of arithmetic tests the public-school pupils received the higher scores. The scores indicate that training schools do slightly better work than public schools. This is particularly true in those phases of school work in which the reflective processes are involved. On the other hand, the public schools secure better results in the formal phases of school work, such as the fundamentals of arithmetic and spelling.

2. There is close correspondence in the scores of the training-school groups and of the public-school groups in a large number of schools in language, spelling, rate of reading, and quality of handwriting. A similar situation was revealed in the case of the formal processes in arithmetic. These facts indicate that the community influences which are felt both in the training schools and in the public schools of a given community may be of greater importance in determining the results of instruction than are the special influences which are associated with either training schools or public schools.

3. The wide variation in scores of public-school groups and training-school groups which enter the same classes in high schools reveals the need for the introduction of scientific methods of directing and supervising the work of both types of schools. It suggests the advisability of requiring given levels of attainment in the fundamentals of the elementary-school subjects to secure admission to high schools. Furthermore, the study suggests that training schools should give more specific attention to the formal processes in some school subjects, and that public schools should train pupils more persistently in the reflective phases of school work.